

**Testimony before the U.S.-China Economic and Security Review Commission**

***Hearing on China's Proliferation and the Impact of Trade Policy  
on Defense Industries in the United States and China***

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Thank you for the opportunity to participate in today's hearing on China's proliferation policies and practices.

China is a recognized nuclear weapon state under the Non-Proliferation Treaty (NPT) and possesses enough nuclear material for hundreds of nuclear weapons. China has approximately 200 nuclear weapons on various delivery platforms, mostly short- and medium-range missiles. Approximately 20 Chinese weapons are deployed on missiles that can reach the continental United States. Starting in the 1960s, China became a major supplier of sensitive nuclear and missile technology to the developing world.

The United States and other countries have worked to draw China step-by-step into the international nonproliferation regime. Over three decades, these efforts have achieved important progress. Technology transfer issues exist, but they are now a relatively minor aspect of the United States-China relationship, comparable to issues that we have with allied nations whose companies engage in nuclear black market sales.

China is of particular nonproliferation importance in two ways. As a nuclear weapon state, it has a large nuclear weapons and material production complex. These weapons and materials are of concern to its neighbors, to the United States, and other potential adversaries. Questions about the security and accountability of the weapons and materials are particularly important. China, however, has also been a major supplier of nuclear technology and equipment in the developing world, and its past behavior in the nuclear and missile fields was a significant nonproliferation concern.

Following its first nuclear test in 1964, China began a slow but steady process of developing a full-fledged nuclear weapons infrastructure and strategic and tactical nuclear arsenal.<sup>1</sup> Having been isolated by the West after the Communist revolution in 1949, China was also isolated from the evolving international framework of peaceful uses of nuclear energy and from the collaboration that produced the International Atomic Energy Agency (IAEA) in the 1950s, the NPT in the late 1960s, and the development of nuclear export control guidelines in the 1970s. As a Communist power during the Cold War, China was

also excluded from the establishment of the Missile Technology Control Regime (MTCR), which originated in 1987 as a Western arrangement to exchange information on and restrain the exports of nuclear-capable missiles and related technology.

In the early years, the People's Republic of China adopted a posture that rhetorically *avored* nuclear weapons proliferation, particularly in the developing world, where this theme once had some appeal as a rallying point for anti-imperialism.<sup>2</sup> Through the 1970s, China's policy was *not to oppose* nuclear proliferation, which it still saw as limiting U.S. and Soviet power. After China began to open to the West in the 1970s, its rhetorical position gradually shifted to one that *opposes* nuclear proliferation.

China's practical approach to the export of nuclear and military goods did not, however, conform to the standards of the international nonproliferation regime. Despite China's de facto commitments in 1992, 1994, and 1998 to uphold the nonproliferation regulations of the MTCR, Chinese state-owned corporations continued to engage in illicit nuclear arms transfers to Pakistan, Iran, North Korea, and Libya.<sup>3</sup> Major efforts have been made over the past 25 years to persuade China to modify its approach formally, bringing it into closer alignment with the policies of the other nuclear supplier states. These efforts have produced demonstrable results, evident in China's accession to the Zangger Committee in October 1997 and to the Nuclear Suppliers Group (NSG) in May 2004 and in greatly reduced technology transfers. China has also signed and ratified the Chemical Weapons Convention and the Biological Weapons Convention, banning the development or stockpiling of chemical and biological weapons. In October 2004, at their meeting in Seoul, the thirty-four members of the MTCR rejected China's bid to become a member, apparently over China's failure to meet fully their nonproliferation standards. Many experts believe that China's entry into the MTCR could deter it from proliferating its nuclear-related materials to countries such as Iran, Pakistan, and North Korea.<sup>4</sup> A domestic export control system has developed with constant U.S. encouragement, but it is still a work in progress and has not yet become completely effective.

China plays a central role in both the North Korean and Iranian proliferation crises. The United States believes that ending North Korea's nuclear program depends heavily on China's ability to pressure Pyongyang. The U.S. Department of State's former director for policy planning, Mitchell Reiss, has characterized China as the "mediator" between North Korea and the U.S. in discussions. China has, he said, "the most influence on the North. And so to get [it] on board . . . gives us much more weight in these negotiations."<sup>5</sup> During an April 2004 visit to China, Vice President Dick Cheney spoke approvingly of China's increased commitment to the nonproliferation regime, while urging it to make economic assistance to North Korea conditional on Pyongyang's cooperation in the six-party talks designed to end its nuclear activities.<sup>6</sup> China played a major and positive role in convincing the North Korea leadership to suspend further tests after its October 2007 nuclear weapon test and to return to the Six Party Talks. China appears committed to ending North Korea's nuclear program, both for its own strategic purposes and to demonstrate the positive aspects of what China refers to as its peaceful rise to great-power status.<sup>7</sup>

China's relationship with Iran has become a greater concern as China's economic relationship with that country grows. In November 2004, China signed oil and gas contracts with Iran worth an estimated \$100 to \$200 billion. (China has also signed oil deals with Brazil, Angola, and Sudan because its booming economy has stimulated a huge and growing need for natural resources.)<sup>8</sup> Nonetheless China has cooperated in passing two UN Security Council resolutions condemning Iran's failure to comply with its nonproliferation obligations under the NPT and has supported the limited sanctions enacted by those resolutions.

China is not looking for a confrontation with the United States over Iran, but neither does it want U.S. actions to increase instability in areas vital to its economic development. It sees Iran and North Korea not as threats that must be confronted but as problems that can be managed through flexible and patient diplomacy.

### **China's Record: A Positive but Mixed Bag**

During the 1990s China made notable strides in adopting international nonproliferation norms, joining international agreements, and controlling exports of sensitive nuclear material and technology. During this period China joined key treaties such as the Nonproliferation Treaty and the Chemical Weapons Convention and ratified the Comprehensive Test Ban Treaty. As noted, Beijing made a series of commitments through bilateral agreements with the United States on both nuclear and ballistic missile transfers.

China softened its stance toward "informal" multilateral control arrangements. However, Beijing still remains on the outskirts of several critical nonproliferation agreements. While China expressed interest in joining the Missile Technology Control Regime (MTCR) in February 2004 it is not a full partner and may not be fully observant of the revised guidelines of 1993.<sup>9</sup> China did not join the 93 countries in signing the International Code of Conduct against Ballistic Missile Proliferation in The Hague on November 25, 2002 and China has declined to join the Bush Administration's Proliferation Security Initiative (PSI).<sup>10</sup>

In the matter of chemical weapons, China has not joined the Australia Group, but in March 2004, China and the Australia Group held discussions on export control, pledging to strengthen ties with the group.<sup>11</sup> China has however adopted export controls mirroring the Australia Group control list and on chemicals listed on CWC schedules. Moreover, U.S. Assistant Secretary of State for Verification, Compliance, and Implementation, Paula DeSutter, has noted the significance of China's "catch-all" provisions for chemical and biological goods. In testimony before this committee she explained that "catch-all" provisions "provide a legal basis to control items not on the lists, if the exporter has reason to believe or has been informed that the items are destined for a CBW program."<sup>12</sup>

During this decade China's proliferation activities narrowed in terms of both their scope and character. Leonard Spector, the Deputy Director of Center for Nonproliferation Studies, has noted that during this period Chinese transfers moved away from sales of complete missile systems to exports of largely dual-use nuclear, chemical, and missile

technologies. Similarly, the number of recipient countries declined dramatically to three—Iran, Pakistan, and North Korea.<sup>13</sup> Spector attributes this change in China’s proliferation activities to three factors: China’s recognition of the economic benefits of maintaining a stable relationship with the United States; Chinese views about the negative impact of proliferation on regional stability in East Asia; and China’s sensitivity to global opinion and desire to be perceived as a responsible member of the international community.<sup>14</sup>

Some political figures and commentators continue to describe China as an indiscriminate proliferator, willing to sell almost anything to the highest bidder. In testimony before this committee, former Assistant Secretary of State Robert Einhorn, explained that “this was a reputation the Chinese did not truly deserve but it persists to this day. Part of the reason is that China’s progress in complying with and enforcing nonproliferation standards over the years has been uneven. The pattern has often been two steps forward, one step back.”<sup>15</sup>

I agree with that assessment. Serious hurdles remain, such as the need to improve export control systems, but the trends are positive.

### ***Improving Export Controls***

Under direct U.S. pressure, China has moved to establish a domestic legal system to control sensitive nuclear exports by private or semiprivate Chinese entities. These steps, while imperfect, were sufficient by 1998 for the United States to certify that China could be trusted to safeguard U.S. sensitive nuclear technology as part of the implementation of the 1985 U.S.–China Agreement for Peaceful Nuclear Cooperation. The certification concluded that “the People’s Republic of China has provided clear and unequivocal assurances to the United States that it is not assisting and will not assist any non-nuclear-weapon state, either directly or indirectly, in acquiring nuclear explosive devices or the material and components for such devices.”<sup>16</sup>

The continuing nature of China’s role as an international supplier of nuclear technology to weapons programs is in question. China disregarded international norms in the 1980s by selling nuclear materials to such countries as Argentina, India, Pakistan, and South Africa, without requiring the items be placed under IAEA safeguards. U.S. Intelligence officials in 2004 concluded, “Over the past several years, Beijing improved its nonproliferation posture through commitments to multilateral nonproliferation regimes, promulgation of expanded export controls, and strengthened oversight mechanisms, but the proliferation behavior of Chinese companies remains of great concern.”<sup>17</sup> Over the past decade the pace of China’s exports have outstripped the capacity of the government to monitor and verify the behavior of Chinese companies. The Chinese export control system has historically lacked the adequate resources, central capacity, and inter-agency coordination to be implemented effectively.<sup>18</sup>

China’s nuclear exports to two particular countries, Pakistan and Iran, have been a leading cause of concern (for history of Chinese exports to Pakistan and Iran, refer to appendix 1). These exports and other issues have provoked several serious crises in United States–China relations and triggered repeated congressional demands for sanctions. During the

eight years of the Clinton administration, Chinese entities were subject to sanctions 17 times. Since 2001, the Bush Administration has imposed sanctions on 19 occasions on 32 different PRC entities. Among those sanctions, the Bush Administration levied missile proliferation sanctions that effectively denied satellite exports (for two years), after a Chinese company transferred technology to Pakistan in 2001, despite its promise in November 2000 to discontinue such practices.<sup>19</sup>

Recently, however, China has taken steps to curb this behavior by its companies. Between November 2006 and February 2007 China's State Council approved two sets of regulations and amendments on nuclear material exports and dual-use exports that clarified the lines of authority within the Chinese government and created a stronger legal basis for enforcing China's export controls. These enhanced regulations aim to put teeth in China's export controls and bring Beijing closer to meeting its obligations under the Nuclear Suppliers Group and United Nations Security Council Resolution 1540.<sup>20</sup> The Center for Nonproliferation Studies (CNS) notes, "This marks the first time that Beijing has included a number of complex nonproliferation issues within its formal regulations."<sup>21</sup> These issues include the spread of highly enriched uranium, sensitive production technology, dual-use technology, nuclear terrorism, and transshipments.<sup>22</sup> CNS notes that the revised regulations increase the authority of relevant agencies—the Ministry of Commerce, Commission of Science, Technology, and Industry for National Defense and the General Administration of Customs—to control the transfer of nuclear-related technology and materials and stipulate required punishments for companies or individuals found in violation.<sup>23</sup>

### ***Controlling China's Fissile Material Stockpile***

A frequently overlooked proliferation issue in China is its large stockpile of weapons-usable fissile material. Although the situation in China seems stable at present, increased political and economic strain could raise the risk of the diversion of fissile material from China's nuclear complex. Little is known about the state of China's material protection, control, and accounting (MPC&A) system. The exact size of China's fissile material stock is unknown because Beijing has not disclosed it or the size of its nuclear weapons stockpile. Analysts estimate that China has produced between 3 and 7 metric tons of weapons-grade plutonium and between 15 and 25 metric tons of highly enriched uranium.<sup>24</sup> China is believed to have ended its production of plutonium for weapons in 1991 and of uranium for weapons in 1987.<sup>25</sup> Chinese weapons are believed to be heavily dependent on weapons-grade uranium, and it is estimated that China uses 20 to 30 kilograms per weapon. Plutonium weapons might require 3 to 4 kilograms on average.<sup>26</sup>

China produced weapons-usable enriched uranium from 1964 until 1987 at two sites, Lanzhou and Heping.<sup>27</sup> Plutonium was also produced at two sites, Jiuquan and Guangyuan, from 1968 until 1991.<sup>28</sup>

China presumably has stored its residual fissile material stocks at various nuclear facilities. Their locations and the amounts of China's nonweaponized fissile material, however, have

not been declared and are not specifically known, nor is the level of security at the storage sites. The China National Nuclear Corporation (which has the status of a government ministry) “produces, stores, and controls all fissile material for civilian as well as military applications.”<sup>29</sup> It is estimated that about fourteen sites associated with China’s nuclear weapons program have significant quantities of weapons-usable fissile material. The primary locations of nonweaponized fissile material are believed to be China’s facilities for plutonium production and uranium enrichment as well as its research institutes for nuclear weapons and other nuclear fuel cycle facilities across the country. Information on China’s MPC&A system is scarce, but the United States has been concerned about it enough to initiate discussions on China’s MPC&A (among other issues) between the national nuclear laboratories in both countries.

Contacts between the nuclear weapons laboratories in the United States and China were developing beginning in 1994, but they were suspended in the wake of allegations of Chinese nuclear espionage in the Wen Ho Lee case in 1999. Although China’s MPC&A system is modeled after the Soviet system, an expert at one of the U.S. national laboratories ranked China’s MPC&A system as better than that of the Soviet Union before it collapsed.<sup>30</sup> In 1996, China commissioned a computerized “national nuclear materials accounting system” at about twelve nuclear facilities to improve its ability to prevent the illegal loss, theft, or transfer of nuclear materials. Still, questions remain about the level of protection at China’s nuclear facilities. China’s MPC&A system is vulnerable to “insider” theft. Also, China lacks the resources to modernize its MCP&A technology.

However, since the September 11, 2001, terrorist attacks, China has renewed efforts to improve international cooperation with the United States to install laboratory-to-laboratory collaboratives to coordinate advanced safeguard techniques between the nations.<sup>31</sup>

### **What Not to Do: Exaggerate the Problem**

Government concern over China, particularly in the Congress, often flares into hysteria. China “scares” emerge with some regularity and are often used to promote other political or ideological agendas. A classic case is the Congressional reaction to allegations in 1998 and 1999 of Chinese nuclear espionage.

That year, reports that China had stolen the designs of the most advanced U.S. nuclear warheads rocked United States–China relations. *The New York Times* launched the scandal in a March 6, 1999 story that claimed, “Working with nuclear secrets stolen from a U.S. government laboratory, China has made a leap in the development of nuclear weapons: the miniaturization of its bombs. . . . Government investigators have identified a suspect, an American scientist at Los Alamos laboratory.”<sup>32</sup>

The story was based on leaks from a special investigative committee in the U.S. House of Representatives chaired by Representative Christopher Cox (R.-CA.). The committee released a glossy, three-volume, declassified report on May 25, 1999, that concluded:

- These thefts of nuclear secrets from our national weapons laboratories enabled the [People's Republic of China, or PRC] to design, develop and successfully test modern strategic nuclear weapons sooner than would otherwise have been possible.
- The stolen U.S. nuclear secrets give the PRC design information on thermonuclear weapons on a par with our own. . . . The stolen information includes classified information on seven U.S. thermonuclear warheads.
- The stolen U.S. secrets have helped the PRC fabricate and successfully test modern strategic thermonuclear weapons.<sup>33</sup>

The committee spent most of its time in 1998 investigating charges that critical technology had been transferred to China by major U.S. corporations while using Chinese rockets to launch U.S. satellites. Some political leaders believed the investigation might lead to impeachment charges against then-president Bill Clinton. Although it was a major political issue during much of 1998, it faded in 1999. The committee turned to the matter of Chinese espionage on October 21, 1998, concluded taking testimony on the issue from three witnesses on November 15, and filed its report on January 3, 1999.

The report led to sensational charges. Wen Ho Lee, a scientist at Los Alamos National Laboratories, was arrested under suspicion of espionage. Stephen Younger, then–associate director for nuclear weapons at Los Alamos, testified at Lee's bail hearing, "These codes and their associated data bases and the input file, combined with someone that knew how to use them, could, in my opinion, in the wrong hands, change the global strategic balance." He added, "They enable the possessor to design the only objects that could result in the military defeat of America's conventional forces. . . . They represent the gravest possible security risk to . . . the supreme national interest."<sup>34</sup>

The Cox committee report recommended that the executive branch conduct a comprehensive damage assessment on the implications of China's acquisition of U.S. nuclear weapons information. The administration did so, forming a team of officials from the intelligence and investigative agencies, including the Central Intelligence Agency (CIA), Federal Bureau of Investigation, and nuclear laboratories. An independent panel of nuclear experts, chaired by Admiral David Jeremiah and including General Brent Scowcroft and John Foster, then reviewed their damage assessment. In April 1999, the panel issued its report. This net assessment reached three critical conclusions:

- China's technical advances have been made on the basis of classified and unclassified information derived from espionage, contact with U.S. and other countries' scientists, conferences and publications, unauthorized media disclosures, declassified U.S. weapons information, and Chinese indigenous development. The relative contribution of each cannot be determined.
- Significant deficiencies remain in the Chinese weapons program. . . . To date, the aggressive Chinese collection effort has not resulted in any apparent modernization of their deployed strategic force or any new nuclear weapons deployment.
- China has had the technical capability to develop a multiple independently targetable reentry vehicle (MIRV) system for its large, currently deployed ICBM for many years, but has not done so.<sup>35</sup>

This assessment contradicted the central claims of the Cox report. As the political fires cooled, most experts agreed with the concerned but cautious independent assessment. The case brought against Lee, the alleged spy, was dropped in 2001 after he was held for months in solitary confinement. A criminal investigation of the charges was resolved in January 2002 with a fine against the Loral Corporation for its failure to follow proper declassification procedures before providing a report to Chinese officials who sought information on launch failures.<sup>36</sup> Neither the Bush administration nor the Senate or House of Representatives has raised anew any of the allegations in the Cox report.

Learning the lessons of this sorry episode in the history of congressional oversight may help prevent its repetition in the near future.

### **What To Do: Engage China, Lead by Example**

The most important step by far to continuing the improvement in China's nonproliferation performance is to continue to integrate China into global institutions and cement its adherence to international norms.

The 2007 report of the Council on Foreign Relations Independent Task Force on U.S.-China Relations recommends precisely this overall approach. It calls for a strategy that combines both balance-of-power and concert-of-power tactics. That is, maintain U.S. strength and global presence, but promote dialogue, transparency and coordination with China. In Asian relations, the report says, this would mean strengthening relations with traditional allies and friends, but also modernizing these relationships to "make room for Chinese participation."<sup>37</sup>

By extension, in nonproliferation, this would mean continuing to promote multilateral treaties and arrangements that help secure American interests, but also responding to Chinese suggestions for new arrangements that would "make room" for Chinese concerns. One specific example would be to resolve the almost decade-long standoff at the Conference on Disarmament that has prevented negotiations on a treaty to end the production of fissile material for nuclear weapons by agreeing to the Chinese request to also explore negotiations on a treaty for the peaceful uses of outer space.

Most importantly, it would be a mistake to believe that increasing U.S. demands on China are raising the level of American hectoring will result in a change in Chinese compliance with nonproliferation norms. The United States is on shaky ground. Most of the world now see the United States as a country that has walked away from its own declared values and norms, that has abandoned the nonproliferation regime it fathered, that is set on creating its own, new norms based primarily on its own perceived needs. Non-nuclear weapon states, for example, are reluctant to take on new responsibilities and new nonproliferation obligations when they believe that the nuclear weapon states, particularly the United States, have not fulfilled pledges to reduce their nuclear weapon stockpiles, and in fact, are increasing the roles and value of nuclear weapons in their own security policies.



Recent examples of what is seen as nuclear hypocrisy include, the advocacy by some in the United States of new battlefield uses for nuclear weapons; programs for new nuclear weapon designs and expanded weapons production; and the U.S.-India nuclear deal that grants India special privileges despite its non-compliance with nonproliferation norms. It is unrealistic to expect great improvement in the behavior of other's until we improve our own behavior. The United States needs to lead the way towards a recommitment to the original bargain of the NPT—the elimination of nuclear weapons. The failure of nuclear weapons states to accept their end of the bargain under Article VI of the NPT has undermined every other aspect of the nonproliferation agenda.

*Universal Compliance*, a 2005 study concluded by the Carnegie Endowment for International Peace, reaffirmed this premise:

The nuclear-weapon states must show that tougher nonproliferation rules not only benefit the powerful but constrain them as well. Nonproliferation is a set of bargains whose fairness must be self-evident if the majority of countries is to support their enforcement . . . The only way to achieve this is to enforce compliance universally, not selectively, including the obligations the nuclear states have taken on themselves...The core bargain of the NPT, and of global nonproliferation politics, can neither be ignored nor wished away. It underpins the international security system and shapes the expectations of citizens and leaders around the world.”<sup>38</sup>

This view is gaining ground in the American strategic community. A January 2007 oped in the *Wall Street Journal* co-authored by George Shultz, Henry Kissinger, William Perry and Sam Nunn, marked a significant change in the thinking of influential policy and decision makers in the United States. They contend that the leaders of the countries in possession of nuclear weapons should turn to the goal of a world without nuclear weapons into a “joint enterprise.” They detail that a nine point program that includes substantial reductions in the size of nuclear forces in all states, the elimination of short-range nuclear weapons, and the ratification of the Comprehensive Test Ban Treaty. The oped concludes that, “Reassertion of the vision of a world free of nuclear weapons and practical measures toward achieving that goal would be, and would be perceived as, a bold initiative consistent with America's moral heritage. The effort could have a profoundly positive impact on the security of future generations.”<sup>39</sup>

What is true in general is true in specific. Tightening Chinese export controls and increasing Chinese commitment to prevention of new nuclear or missile programs in new nations will be easier and faster when the United States, China and other major powers are moving together towards a world free of nuclear weapons. Other approaches are likely to offer only temporary improvements, ultimately failing if the nonproliferation regime collapses.

## **Appendix 1: Chinese Export History with Pakistan and Iran**

### **PAKISTAN**

**PAST EXPORTS TO PAKISTAN.** China's assistance to Pakistan's nuclear program may have been critical to Pakistan's nuclear weapons breakthroughs in the 1980s. In the early 1980s, China is believed to have supplied Pakistan with the plans for one of its earlier nuclear bombs and possibly to have provided enough highly enriched uranium for two such weapons.<sup>40</sup> According to an August 1997 report by the U.S. Arms Control and Disarmament Agency: "Prior to China's [1992] accession [to the NPT], the United States concluded that China had assisted Pakistan in developing nuclear explosives. . . . Questions remain about contacts between Chinese entities and elements associated with Pakistan's nuclear weapons program."<sup>41</sup> In February 2004, Libya turned over to U.S. officials Chinese nuclear bomb designs that it had received from Pakistan's illicit nuclear black market.<sup>42</sup>

China also assisted Pakistan with the construction of an unsafeguarded 50- to 70-megawatt-thermal (MWt) plutonium production reactor at Khusab, and the completion of a plutonium-reprocessing facility at Chasma that had been started with French assistance in the early 1970s.<sup>43</sup> Since June 2000, Khusab has been producing between 8 and 10 kilograms of weapons-grade plutonium a year.<sup>44</sup> China pledged to the United States that it would not export heavy water for the Khusab reactor, but when reports in 1998 claimed China was transferring an excess of heavy water to the KANUPP reactor, the U.S. suspected that it may be rerouted to fuel the military reactor at Khusab.<sup>45</sup> China in 1995 also sold Pakistan ring magnets used on centrifuges for enriching uranium at the A. Q. Khan Research Laboratory in Kahuta.

China has also assisted Pakistan's civilian nuclear program, circumventing the nuclear trade embargo on Pakistan observed by members of the Nuclear Suppliers Group, by helping build a 300-megawatt-electric (MWe) power reactor at Chasma. This reactor will be placed under IAEA safeguards as a condition-of supply under the existing China-Pakistan agreement for peaceful nuclear cooperation.

Pakistan has not accepted full-scope safeguards as its official government policy, but it has accepted IAEA safeguards for the KANUPP power reactor, the PARR I and PARR II, and Chasma.<sup>46</sup> China will also proceed with plans to build the Chasma II reactor, and U.S. government officials state that IAEA safeguards will apply. The NSG allows members to fulfill agreements made before their accession to the group.<sup>47</sup>

China does not appear to have supplied any new weapons technology to Pakistan. China's close ties proved useful as Chinese officials played a quiet but—according to U.S. diplomats—crucial role in supporting Pakistan and coordinating with the United States after the September 11 attacks.<sup>48</sup>

## **IRAN**

**EXPORTS TO IRAN.** China has also been a principal supplier of nuclear technology to Iran. China provided Iran with three zero-power and one very small (30-kilowatt-thermal) research reactor, as well as two or three small calutrons (electromagnetic isotope separation machines). While calutrons in those numbers would not themselves produce fissile uranium in significant quantities, they would serve to train personnel in a sensitive nuclear activity.<sup>49</sup> China and Iran signed a ten-year nuclear cooperation agreement in 1990, and Iran agreed in 1992 to purchase two 300-MWe pressurized-water reactors from China.<sup>50</sup>

The United States has led an international effort to prevent the supply of nuclear technology to Iran and has placed pressure on China (and other suppliers) to cancel nuclear deals with Iran. United States pressure has made a difference. By 1995, there were signs that China's nuclear cooperation with Iran was being scaled back. Another factor in this retrenchment may have been Russia's competition as an alternative supplier. Russia agreed to supply light-water nuclear reactors to Iran and to help Iran finish construction of the Bushehr nuclear power plant, which had been abandoned by German contractors during the Iran-Iraq War. Opposition from the United States to China's reactor contract probably also played a part.<sup>51</sup> Iranian shortages of capital may have been a third factor. At any rate, in September 1995 China finally agreed to "suspend for the time being" its reactor sale to Iran.<sup>52</sup> A few months later, a Chinese Foreign Ministry spokesman acknowledged that "the implementation of the agreements between China and Iran on nuclear cooperation has ceased."<sup>53</sup>

China continued until 1997, however, to assist Iran in constructing a plant near Isfahan to produce uranium hexafluoride, the material fed into gas centrifuges for enrichment. Chinese technicians were assisting Iran with other parts of the nuclear fuel cycle, such as uranium mining and processing and fuel fabrication.<sup>54</sup> Yet it seems that these activities were carried out in accordance with the NPT and under IAEA safeguards.

In October 1997, China agreed to end cooperation with Iran on the uranium conversion facility and not to undertake any new cooperation with Iran after completion of the two existing projects—the zero-power reactor and a zirconium production plant. During a visit to these facilities by one of the authors in March 2005, the Chinese-built heavy machinery was clearly in evidence. Iranian officials expressed their frustration at the abrupt end to the Chinese assistance, which they said made their work more difficult. As of early 2005, Iran had still not been able to produce finished zirconium or uranium hexafluoride of adequate quality for use in centrifuges. U.S. intelligence assessments note that "although the Chinese appear to have lived up to these commitments, we are aware of some interactions between Chinese and Iranian entities that have raised questions about its 'no new nuclear cooperation' pledge. According to the State Department, the administration is seeking to address these questions with appropriate Chinese authorities."<sup>55</sup>

## Sensitive Missile Exports

As with its nuclear exports, China's role as a provider of missile and missile-related technology to several countries has been a controversial issue in overall relations with the United States and other countries. China reportedly has aided the missile programs of Iran, Iraq, Libya, North Korea, Pakistan, Saudi Arabia, and Syria, although the extent of that assistance has been greatly reduced in recent years. Unlike in the nuclear arena, however, there are no international treaties that prohibit the export of ballistic missiles and related equipment. China was not involved in the creation of the MTCR and for many years resisted being held to its standards. Over time—through the application of sanctions required under U.S. law for the export of missiles and equipment, and with the incentive of licensing the launch of U.S. satellites on Chinese commercial space launch vehicles—China did agree to abide by some terms of the MTCR. The CIA stated in 2003 that “although Beijing has taken some steps to educate firms and individuals on the new missile-related export regulations—offering its first national training course on Chinese export controls in February 2003—Chinese entities continued to work with Pakistan and Iran on ballistic missile-related projects during the first half of 2003.” In May 2004, the Bush administration placed sanctions on thirteen foreign companies, five of which were Chinese, for exporting nuclear-related materials to Iran.<sup>56</sup>

**PAST EXPORTS TO PAKISTAN.** China was believed to have transferred key components for the short-range, nuclear-capable M-11 surface-to-surface missiles to Pakistan in the early 1990s. In June 1991, the United States imposed MTCR Category II sanctions against entities in Pakistan and China for missile technology transfers. These sanctions were lifted in March 1992 after the United States received written confirmation from China that it would abide by the MTCR “guidelines and parameters.” Washington took this confirmation to mean that China would not export either the M-9 or the M-11 missile.

But reports surfaced that China had again transferred complete M-11s to Pakistan in late 1992. The Clinton administration again imposed Category II sanctions on Pakistan and China in August 1993. These sanctions were lifted in October 1994 after China again promised not to export M-11 or similar missiles, and to abide by the “guidelines and parameters” of the MTCR.

Press reports in the fall of 1996 revealed new evidence of additional Chinese transfers of complete M-11 missiles to Pakistan. One quoted a recent U.S. National Intelligence Estimate that indicated that Pakistan already had roughly three dozen M-11s stored in canisters at the Sargodha Air Force Base, west of Lahore, along with maintenance facilities and missile launchers.<sup>57</sup> It was said that those missiles, although not “operational,” could be unpacked, mated with launchers, and made ready for launch in 48 hours. Even more disturbing in the report was the conclusion that Pakistan, using blueprints and equipment supplied by China, had begun construction of a factory in late 1995 that was capable of producing short-range, solid-fuel missiles based on the Chinese-designed M-11. The factory, located near Rawalpindi, was then expected to be operational in one or two years.<sup>58</sup>

A Chinese supply of complete missiles, or of the production technology for missiles covered by the MTCR would be a major violation of MTCR guidelines and, according to U.S. law, would trigger Category I sanctions—which could block all trade between the United States and Chinese aerospace and electronics firms. China and Pakistan have both denied the existence of the missile plant.<sup>59</sup>

In April 1997, U.S. State Department official Robert Einhorn reiterated the Clinton administration's concerns over Chinese transfers of missile-related components, technology, and production technology to Pakistan.<sup>60</sup> He also said that the United States could not make the determination that complete, operational missiles had been transferred; such a determination would require a “high evidentiary standard” because the consequences of sanctions on U.S. firms would be highly damaging. The CIA reported in 2003 that Chinese entities continued to assist Pakistan in the “serial production of solid-propellant [short-range ballistic missiles] and supported the development of solid-propellant [medium-range ballistic missiles].”<sup>61</sup>

**EXPORTS TO IRAN.** China has been a supplier to Iran of antiship cruise missiles (Silkworms, C-801s, and C-802s), dating back to the Iran-Iraq War in the 1980s. More recently, China has also played a role in Iran's efforts to set up an indigenous ballistic missile development and production program. In June 1995, the CIA had reportedly concluded that China had delivered guidance systems, rocket fuel ingredients, and computerized machine tools to Iran to assist that country in improving imported ballistic missiles and in producing its own missiles.<sup>62</sup> In August 1996, the China Precision Engineering Institute reportedly agreed to sell missile guidance equipment to Iran.<sup>63</sup> China has transferred short-range CSS-8 ballistic missiles to Iran. In addition, China has sold ten fast-attack craft armed with C-802 antiship cruise missiles to Iran, and Iran is modifying additional fastattack craft to launch the missiles. In 1997, China pledged to the United States that it would not export C-801s and C-802s.<sup>64</sup> China has improved relations with the United States by making de facto commitments to halt missile-related transfers in 1992, 1994, 1998, 2000, and 2002.<sup>65</sup> In 2002, China released a white paper listing a comprehensive set of export controls that reiterated many of those stated in the MTCR.<sup>66</sup> Nevertheless, the United States placed sanctions on 28 Chinese companies or individuals, most recently in December 2004.<sup>67</sup> The CIA reported in 2003 that “ballistic missile-related cooperation from entities in the former Soviet Union, North Korea, and China over the years has helped Iran move toward its goal of becoming self-sufficient in the production of ballistic missiles. Such assistance during the first half of 2003 continued to include equipment, technology, and expertise.”<sup>68</sup>

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